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## THOROUGHNESS VS. BREADTH.<sup>1</sup>

IN asking you to consider this well-worn topic, let me say at once that I hold no brief for the older, less varied, curriculum which seems to be the ideal of some parents and teachers ; for I am fully convinced of the educational value of the new learning, if I may so designate those studies in literature and science the worth of which is often challenged by critics of our present education.

By way of definition let me say that by "breadth" I mean to refer to the enrichment and enlargement of the high-school curriculum which have come with the introduction of new studies in science and literature, together with new studies of a supposedly more practical bearing on the business life which most of the pupils are shortly to enter.

These new studies have been introduced in response to three different demands: a demand for a wider culture, for a more practical training, or for a fuller preparation for college. Of these three, that made in the interest of a wider culture is undoubtedly most responsible for the multiplication of high-school studies; though the advocates of what is regarded as practical education have urged a demand hardly less insistent; the colleges also have increased their entrance requirements, sometimes placing a heavy burden on high schools.

For the colleges it may be said with clear emphasis that we are far more interested in what a student can do than in the number of things he has studied. The entrance requirements mean to us incidentally that students are ready to pursue advanced work in language and mathematics and other kinds of learning, building on the studies covered in the preparatory course. The requirements mean to us chiefly, however, that the student has attained a stage of intellectual maturity and a possession of his own intellectual powers which fit him for college

<sup>1</sup>Delivered before the Associated Academic Principals of the State of New York, at Syracuse, December 29, 1902.

work, in company with other students equally disciplined and prepared. The introduction of courses in Greek for beginners at Harvard, Yale, Bowdoin, Brown, Smith, Vassar, Bryn Mawr, and elsewhere indicates how far the present tendency in college requirements has swung away from rigid insistence on the traditional classical training. Of that classical training something will be said later. Now it is enough to say that our present anxiety concerns the securing of a preparation for college work as thorough and effective as that which results from the traditional classical education. The college demand is not hostile to the broadening of high-school work. Hostility would be ignoble, if the colleges were in a position to dictate the high-school curriculum; it would be futile in view of the small fraction of the high-school constituency which looks toward a college course. On the contrary, the colleges year by year announce increasing readiness to recognize as means of preparation for entrance new studies in the modern languages, in science, in history. And they have been the allies, if not the leaders, of those who have sought to secure more worthy study of English—both the language and the literature—in our preparatory and high schools. But, as I have said, the colleges care more for thorough training than they do for the particular subjects studied in pursuit of that training.

For the advocates of what is called “practical education” I may not presume to speak so confidently. Some things are made clear, however, by the attitude of business men and manufacturers toward the so-called practical training offered in schools. We need not heed the frank contempt of men who give small thought to the possibilities of preparing students in schools for work in offices and factories. We may rather note the fact that those who welcome every such attempt, rationally conducted, agree that the technique of any business or trade is to be learned best in the office or the factory. Experience there means more for the boy who is seeking employment than commercial courses in school. I am referring now to what President Hadley would probably call technical studies in high schools. For professional engineers certain kinds of training in

technical schools are indispensable for the highest advancement in industrial leadership. Yet engineers, like all the rest of us, have their largest lessons to learn in applying their knowledge to practical ends while actually doing their share of the world's work. That which is of most worth to them is not their drill in technique of engineering, but their grasp of fundamental principles of science and their knowledge of life and of intellectual processes.

Of this the significance for our problem is that that education is of most value which turns out the best thinker. Practical men are eager to take into their employ pupils from our schools who know well the fundamentals of expression and of reckoning. If to these there is added familiarity with some of the common methods of accounting, or the use of tools, or other technical detail, well and good. But our business and industrial leaders do not want machines adjusted to a certain task, to be done in a certain way; they want minds capable of clear and prompt thinking, able to adjust themselves quickly to new situations as they arise. I am not opposing instruction in commercial arithmetic, bookkeeping, typewriting, shopwork, and the like. I could make a strong plea for some of them. But I am calling attention to the fact that practical men agree with the colleges in asking the schools first of all to give them boys and girls who can *think*, who know to some extent their own powers, and are able to see into a simple problem when they meet one and to find a way of solving it.

In the interest of culture all thoughtful men must say much the same as I have said on behalf of the colleges and, perhaps presumptuously, for the advocates of practical training. That school does not give its pupils the broadest culture which furnishes them most abundantly with information on many subjects. The old custom of giving "fourteen-week courses" in half a dozen sciences, and cursory surveys of the broad field of literature, with quotations of striking passages, failed signally of securing real culture. The simpler and more interesting results of scientific research may be learned by reading entertaining books about the evening lamp, by following the pages of *The Scien-*

*tific American*, or by watching the columns of our modern voluminous dailies. Out of school this information may be got really better than in school, for each year sees such learning modified, if not quite superseded.

The culture value of the study of science or literature in school consists in some mastery, however slight, of the subject and its methods. A year of physics in a high school, wisely directed, will show a student the beginning of the meaning of physics, and will give him an idea of how to think about a physical problem and how to go about its solution, which is worth ten times over any number of short courses of text-book work and teacher's desk experiments in a half-dozen sciences. At the end of the year he will not have become familiar with as many things, but he will know a great deal more. And this larger knowledge will fit him by himself in cursory reading to learn and understand far more of a half-dozen other sciences than all the short courses conceivable could give him. Such a year of discovery of how little he knows and of how difficult the gaining of real knowledge is will give him a respect for all scientific work, which will deepen his interest, enlarge his reverence, and insure his sanity of judgment.

What I have said of science is true of all other learning. If the interests of culture ask for the introduction of new subjects in our schools—and they make a quite valid demand—they assuredly ask for something much more respectable than a smattering of many things with scant appreciation of their significance.

These considerations lead naturally to the inquiry: What does thoroughness demand? In answer let me emphasize three essentials of any education which would be thorough.

1. It must provide for consecutive work; that is, the pursuit of a given subject, or what is practically one subject, for not less than a year of daily work, preferably for three or four years. Here is the real service rendered to high schools by the college-entrance requirements. To take up college Latin a student must have been at work on Latin consecutively for four years; the Greek requirement means three years' work; the modern-

language requirements call for two or three years in each language; the mathematical requirement demands at least a year of algebra followed by a year of geometry; while in history and in such scientific work as is accepted the demand for consecutive work continued not less than a year grows ever clearer. This is not an arbitrary requirement. Colleges regard their work seriously and feel compelled to ask that students who undertake it have some acquaintance with serious work. So far as the colleges influence the high schools, therefore, they accent emphatically the demand for consecutive work.

The demand is not arbitrary, I say, because a student's knowledge of a subject grows in an accelerating ratio as he lengthens his attention to it. A few weeks may be spent on a science, or literature, or a period of history, without bringing to the student's consciousness any sense of the significance or the method of the subject. He will be occupied—and either wearied or entertained according to his idiosyncrasy—with the common facts of the subject. It is when he has passed beyond the recounting of familiar results, and problems offer themselves for study, that the student begins to sink his intellectual plummet deeper, and to learn not only more of the subject, but more of his own power and weakness in dealing with it.

The demand for consecutive work is further justified by the fact that a student's ability to appreciate and analyze new problems grows in proportion as he masters the difficulties and intricacies of some task which he is set to perform. For practical life that which is of greatest importance for a man is that he shall quickly recognize what his day's problem involves, and shall be able clearly to decide what it demands of him and what he can do with it. Unless in school the boy has come to be something more than "a picker up of learning's crumbs," by carrying some piece of work through to relative mastery, the school has failed to fit him for these later and more serious problems.

2. A thorough education calls for individual work which demands some measure of independent thinking. This second essential is, in fact, but a corollary of the first, for the value of

consecutive work is that it does call out individual thinking. Yet I believe that the experience of many of us will testify that we were left too free from the demand for our own independent thought. We leaned too hard on the answers set at the end of our problems in arithmetic and algebra, followed too slavishly the rules and sample demonstrations. It is the boast of the new learning, especially the study of science, that it has forced the laboratory into the schools. It is a valid boast in so far as in the laboratories the students are compelled to trust their own senses and record their own results. In this demand for individual work the new learning joins hands with the old-fashioned discipline of exact and independent translation from classical texts. Both that old and the new discipline are now joined in the demand for independent work by the newer method in the oldest of sciences—mathematics. The growth of insistence on the original solution of problems, or demonstration of theorems of which only the statement is given, is evidence of increasing recognition of the demand for thoroughly individual and independent thinking.

Not all subjects lend themselves as readily to such independent work as do sciences, classical texts, and mathematics. Yet history and literature may offer opportunity for the exercise of the power to analyze the elements of a living situation, and to bring known facts and principles to bear on it for its explanation. An education which is ambitious to be thorough will find opportunity at all times to challenge individual thought and call out independent opinion.

3. A third essential in a thorough education is the clear expression of the results of work done. President Hadley seems to believe that this power of clear expression was more highly regarded formerly than it is now, and he instances the departure from the rigid formality of Euclidian demonstration in geometry. I am not sure that the laboratory method does not at first encourage carelessness concerning clear expression, being content if only results be correct. Undoubtedly there have been and are men who can express their thought clearly and adequately only in some form of work done. Our modern

interest in manual training is evidence that we are recognizing that all work is a form of expression of ideas. Yet the few for whom some form of work is their only mode of expression for clear thought would be more effective could they also state their ideas in simple, transparent language; while the mistaken many who try to hide careless thought behind the plea of inability to express themselves adequately will owe a debt incalculable to any teacher who will force them to set their own half-formed and inconsequential ideas before themselves in naked speech.

The demand for thoroughness asks teachers not to pass a demonstration in mathematics which shows correct results, but omits essential steps in the process; asks them to insist on a student's stating the whole process with logical and rhetorical completeness. It asks teachers to insist on clear and felicitous translations, and to suffer no student to labor under the impression that he understands a foreign sentence when he has caught some faint glimmering of a possible meaning for it. I had a rare and merciless teacher once who would listen to his student's floundering efforts to put a Greek clause into English, and when he had struggled long enough to have discovered his own ignorance the teacher was wont to remark with a twinkle in his eye: "You have the tail feathers of that idea, but the bird got away from you." Moreover, if the advocates of the laboratory method desire to show the skeptical what an excellent logical discipline it may be, they can do so in no way so surely as by adopting the old disheartening dictum some of us used to hear: "If you can't express it, you don't know it." For the great majority of students, exact thinking waits on clear statement. We do not know what we think until we try to tell it. We only discover some of our own absurdities when we state them in order to defend them. The school does a student an injustice if he leaves its halls without long familiarity with the demand that anything he may have to say be said clearly and truly.

These three essentials—consecutive work, individual thinking, clear expression—constitute the apology which thoroughness offers for lifting up its voice amid the new invitations



which our greatly widened horizon of knowledge issues to our schools and to our youth.

Let me assert again that such thoroughness is no foe to the new learning. The old strife between the classicists and the advocates of science has obscured our vision somewhat. The defenders of the old training have made discipline their shibboleth and thoroughness their idol. And they have had much justification; for whatever the classical training failed, or fails, to do, it made, and makes, thinkers. The professor of biology in Rochester, himself not a classicist by training, but an ardent devotee of science, confesses that he cannot explain the fact, any more than he can deny it, that the students who take hold of laboratory problems and adopt laboratory methods most readily and effectively are those who come to him from the study of Latin and Greek. We have no notion that Greek roots or Latin syntax hold a magical key to all forms of knowledge. The valid foundation for the classicists' claim has too often been obscured under an insistence that culture must build on the attainments of Greece and Rome. Within a few months the Nestor of Massachusetts' politicians has voiced this sentiment with rare beauty and affectionate retrospect. Our generation, however, faces tomorrow more eagerly than yesterday. We are readily impatient of tradition. While much could come from my heart in the way of plea for the refinement of the old culture, I will not permit myself to obscure what I believe to be the chief validity of the claim of the older curriculum. It gained and has its hold because it trained students to do clear, continuous, and valid thinking, and to give that thinking plain, true, effective expression. This is what thoroughness asks of our modern schools; and in advocating it we may set aside entirely all question concerning the studies which shall serve to beget such forceful thinking and clear expression.

Yet there is a limit which thoroughness would set to the so-called broadening of our school work. It would check dabbling. The world today is, even for the young, a wonder-book surpassing all classic myths and childhood fables. This very fulness of marvel is our danger. We would have our chil-

dren learn about botany, and physics, and chemistry, and storms, and climate, and economics, and psychology, and far more things than Horatio's philosophy dreamed of. Our constant temptation is to dabble; the student would flit hither and yon, butterfly-like, sucking the sweets out of all these flowers of learning. Our school authorities, too, are often caught with a passion to advertise a broad curriculum, and therefore seek to introduce a little of this and a little of that, a few weeks of botany, a few weeks of physical geography. With fullest respect for the dignity of this new learning, and for the possible value for thorough education of any one of these new tempters, thoroughness lifts up its voice and pleads for moderation. It would have two limits recognized:

1. *The limit of decent efficiency.*—For the old learning a quite meager apparatus sufficed, and efficient teachers were not hard to find. For the new learning the good teacher is rare and the adequate equipment is costly. If a school can find the teacher—and they are growing more plentiful—if it can supply the needed apparatus, then it owes it to its students to give them the opportunity to gain power to think clearly and to express their thought effectively by means of the new learning. It hardly needs to be said that the rare teacher is of more importance than the costly equipment. The good teacher can make a good laboratory out of most unpromising material. Elaborate apparatus is worse than wasted if it is not used efficiently.

Obviously this plea for moderation is addressed chiefly to the schools of smaller communities, where resources are limited. When one visits the laboratories of such noble schools as are now growing up in our cities, one has no apprehension that the new science will be slightly taught.

2. There is another plea for moderation which concerns schools small and large alike, and probably concerns the large schools more vitally than the smaller ones. It is that they recognize the limit of *real advantage to the pupils*. The temptation to expand and add new subjects sometimes carries our schools beyond the natural bounds of adolescent life. I know a school which boasts an eminent teacher in literature. He is a man of rare culture

and profound insight. Yet he lacks sympathy with the limitations of youth, or he would not send boys and girls of seventeen or eighteen home to meditate on the spiritual significance of some of Robert Browning's profounder poems. I do not underestimate the idealism and spiritual insight of youth. But if there is a poet who does not sing for the adolescent years, but for men and women who have drunk much of life's cup of delight and bitterness, it is Robert Browning. Boys and girls of sensitive nature may imagine that they appreciate the poet's passion and inspiration; but in the measure in which they do so they are spiritually maimed and wronged. Some things belong to the years of youth, and some do not. The man or woman who elects to teach youth chooses a most exalted life; but he must not expect to have his teaching and his own life's interest run in open comradeship. He has become a servant. Every deepening of his own spirit—by following the lead of Browning or any other prophet—will enrich his power to help the youth he serves; but then he must serve, with supreme reverence for their years and their right to take life's lessons in life's normal order.

I have instanced this case which came under my observation. Literature is not the only subject which properly calls for recognition of the limits of real advantage to the pupils. I believe that the Committee of Ten did wisely in advising that economics be omitted from the high-school program. Psychology would need to be taught by a wise man to have its place in those early years. Similarly, in those sciences which fitly find a place in high schools, teachers need to recognize at every turn the limit of real advantage to the pupils, in selecting the work to be done, and setting bounds to it. I know a school to whose manual-training equipment there has been added by most generous impulse one or two pieces of apparatus for testing the strength of materials. Such apparatus is meant for work which students become ready only after many more years of training in the course which looks toward engineering. For younger students its presence may be vicious in encouraging in them a vain impression that they know what the apparatus is meant to teach. I think that we are suffering from a lack of recognition, on the part of some teachers, of

the limits which the age and stage of maturity of their students set to the things that may wisely be taught them.

We all need to learn the dignity and high respectability of thorough work, done in a range of subjects as wide as our resources and the nature of our students will make practicable. Dabbling is always vicious. The small school should not blush in the presence of its large city comrade. Too many leaders in the world's life have come from small schools and proved the efficiency of thorough, even if narrow, training, to justify that blush. Ambition does well to seek after ever-broadening culture; but greater than this is thoroughness of work in the widest range of subjects that is honestly practicable.

The message, then, is simple :

1. In planning your work seek first of all thoroughness as far as you go, that your students may gain the priceless power to think clearly, continuously, validly, and to express themselves plainly, truly, and effectively.

2. Broaden your work by taking on the new learning as much as you can and do it thoroughly.

3. If demand for more informational studies seems imperative, add one or two, and make it plain that they are for information only, for the purpose of widening the student's horizon.

4. Remember, and help your student to understand, that if you train him to be a thinker, capable of clear expression, his broadening knowledge will readily take care of itself; while, if you turn out a small walking encyclopædia, he will soon be out of date and gathering dust upon the shelf.

Therefore let it be a prime determination to give students as rich an education as possible, but at all hazards to train in them the power of clear, consecutive, valid thinking, and plain, true, effective expression.

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